



AfricanBioServices Updates

July 2016

Note from the project coordinator



The first year of the AfricanBioServices project is now over. About 100 scientists are now working in the field, in the lab or with already collected data to meet the goals of the project. The executive committee reviewed the research plans for all of them in June and the next step will be to report their findings based on these plans. This is how the European Union wants it and we have to adhere to their requirements.

Most of the 13 beneficiaries have appointed at least one PhD student in their groups; these will be some of the outcomes of this project. All PhD students are developing their research plans at different universities. My hope is that they will all graduate before the project terminates. My wish is, furthermore, that all PhD students will succeed with their data collection and graduate in the name and spirit of AfricanBioServices. These students will be our sons and daughters who will continue with the important work we have started in the name of this project.

Our first deliverable was the Data Management Plan. Please ensure you use this plan when developing your own projects. An important promise of this project is that we shall leave a database that can be used for coming generations. Therefore, all of us have to follow the designated system, develop metadata plans and input our data into the data repository for further upload into the AfricanBioServices database.

Finally, we have agreed about a Communication Plan to guide us on how to communicate among ourselves as well as with our external audiences, including the local communities. It is therefore important that we all use this plan to communicate. Furthermore, we must all use the e-room for communication. Communication is still the key for our success. Good luck!

Eivin Røskaft

Coordinator, AfricanBioServices project

Teams make progress in organization of socio-economic and ecological data

The teams from the Kenya Directorate of Resource Surveys and Remote Sensing (DRSRS) and the Tanzania Wildlife Research Institute (TAWIRI), collaborating on work package (WP) 1, are responsible for identifying gaps in existing data and collecting, organizing and integrating socio-economic and ecological data for use by the other WPs. Between January and June 2016, the WP1 team accomplished the following tasks:

Preparation of the data management plan: The team worked with the Norwegian University of Science and Technology (NTNU) to prepare the data management plan, a document that describes the life cycle of all datasets, how they were collected, processed, generated and stored, how the datasets will be made available during the project and how they will be curated when the project ends. The first version of the data management plan was circulated to all partners in February and is presently uploaded in our e-room. The data management plan will be updated following different phases, as indicated in the project document.



Database group developing the data management plan in Serengeti, Tanzania, February 2016 (photo contributed by Janemary Ntalwila).

Collection of socio-economic data: Existing socio-economic data from various institutions have been collected, compiled and uploaded in the project repository. Data on human and livestock demography for specific study villages have not yet been collected as we are awaiting confirmation of the targeted study villages.

Training of enumerators: In collaboration with the WP5 team, a workshop was held in April to train 13 enumerators (TAWIRI staff) and pretest questionnaires. The trained enumerators will assist in field surveys on socio-economic data collection to fill the gaps. The team also undertook a preliminary site selection visit to identify villages around Serengeti National Park for inclusion in the study. Of the 23 villages identified, 20 will be included in the study.

Collection of ecological and environmental data: Existing biodiversity, climatic and hydrological datasets have been collected and uploaded into the project repository (<http://africanbioservices.webhosting.rug.nl/wHomePage>) and database (<http://www.bio.ntnu.no/tanzania/login.php>). However, some hydrological data are yet to be collected. The team has assisted other WPs in their field work, for example, surveys on biodiversity. Selection of study sites and data collection on vegetation study for WP2 and WP4 have commenced. The small mammal survey and road transect surveys on large mammals for wet season were completed in May. Immobilization of impala, wildebeest and zebra for global positioning system (GPS) radio collaring has commenced. Water samples in communities in all study areas have been analyzed for coliforms; positive samples will be analyzed further for molecular detection of bacteria species. Preliminary analysis indicates that about 77% (n = 58) of sampled water sources contain faecal contamination.

Uploading of data into the project repository and database: With assistance from NTNU, several datasets have been uploaded into the project repository and project database. We have uploaded about 305 publications related to socio-economic studies in the Serengeti–Mara ecosystem, large mammals (15), small mammals (25), birds (11), reptiles and amphibians (14) and plants (20). We have also uploaded data from the aerial elephant census of 2014 (total counts), rainfall data, human demographic data from the population census of 2001 and 2012, socio-ecological data from the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) project, alien and invasive plant species, plant species diversity and abundance (from the IPBES project), long-term aerial census data for elephant and buffalo and standards for all uploaded datasets.

Purchase of project vehicles: For some time, transport has been a major constraint in the data collection tasks. Between March and May, TAWIRI in collaboration with NTNU purchased five project vehicles that have been allocated to four WPs with one on standby for use between other partners during their field work. A protocol on how to use and share the vehicles between WPs has also been developed by WP7.



One of the project vehicles managed by WP5 (photo contributed by Janemary Ntalwila). Contributed by Janemary Ntalwila, Robert Fyumagwa, Angela Mwakatobe, Devolent Mtui and Machoke Mwita

Impala fitted with collars to help researchers understand how land use may affect herbivores in Serengeti

The sustainability of ecosystems and the services that they provide are compromised by a variety of anthropogenic processes. It is necessary to understand how human-induced stresses may affect ecosystems in order to be able to mitigate the potential negative effects.

While negative anthropogenic processes are largely curtailed within the protected Serengeti National Park, a diverse array of threats lurks along and immediately outside the park's boundaries.

For large mammals, indirect threats may take the form of altered habitat, for example, deforestation of woodland habitats, or more directly through poaching or persecution. Animals alter their behaviour and habitat selection in response to such mortality risks, which may additionally elevate stress hormone levels.

To investigate how different types of land use in and around the Serengeti may affect herbivores, AfricanBioServices researchers are using the impala antelope, common in most woodland habitats across East and southern Africa, as a model species.

Recently, researchers from TAWIRI, NTNU and the Norwegian Institute for Nature Research commenced fieldwork where their first task was to deploy 20 satellite GPS collars. Once fitted, the units are programmed to record hourly GPS locations providing a detailed insight into movement behaviour.

In addition, the collars are equipped with accelerometers that provide high-resolution activity sensor data. In combination, the data received from the collars will allow researchers to contrast movement, activity, habitat selection and behavioural decisions in different land use types in and around Serengeti National Park.



Immobilizing, weighing, and fitting impala with satellite GPS collars in Serengeti National Park (photo credit: Craig Jackson).

Insights gleaned from the movement and activity data will be further complemented by data collected during regular fieldwork. Here, detailed observations will assess how herds' behaviour, particularly in response to the presence of humans, may differ depending on the presence or absence of threatening processes, such as areas where they are exposed to high levels of bushmeat poaching or well protected within the national park. Faecal samples will be collected during this fieldwork, facilitating the subsequent extraction and analysis of stress hormone levels. The comprehensive study, therefore, aims to generate a greater understanding of how diverse human activities and land use types may affect a model ungulate species.

Contributed by Craig Jackson

Teams make good progress in setting up field sites and mapping the study area

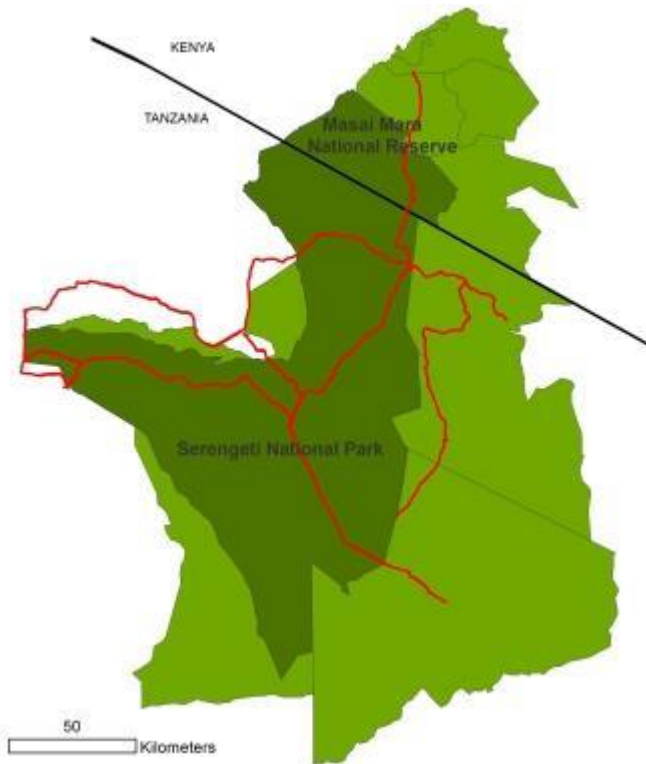
While the autumn of 2015 mostly focused on planning, employing people, ordering equipment, obtaining permits and identifying study sites, the WP2 team is now either busy creating land use maps of the entire Serengeti–Mara region or working in the field to set up study sites and collar animals.

Researchers from DRSRS, NTNU, TAWIRI and the International Livestock Research Institute

(ILRI) are working together on mapping the region. In October 2015, two researchers from TAWIRI (Hamza Kija and Machoke Mwita) and one from NTNU (Francesca Verones) visited Gordon Ojwang, Merceline Ojwala and Mohammed Said at DRSRS in Nairobi to discuss plans for how to analyse the large geographical patterns of the regions and which scenarios of future development of the region the group would analyse. In May this year, Hamza Kija was in Nairobi again to work with his Kenyan partners who provided him with new knowledge on how to use the random forests method. Soon it will be time for people to get out into the field and ground truth the maps they have developed.

Collaring of animals is a major task that took place mainly during the first half of 2016. Collaring of impala started at the end of April in the central parts of Serengeti National Park, the western corridor and northern Loliondo (see Craig Jackson's article above for details on impala collaring). Initially, 14 animals were fitted with GPS collars. This was followed by an intense period of collaring of zebra and wildebeest in May. Five packs of wild dogs have so far been collared in the Ngorongoro Conservation Area and Loliondo.

During spring, road transects in most of the region were surveyed to monitor the diversity of large mammals and birds observed from a vehicle. Several of these transects have been monitored in other projects in the past (for example, the IPBES project) and changes in diversity along these transects can therefore be analysed from 1996 until 2018. What lacks at the moment is establishment of a transect through the Loliondo region in Tanzania and the Mara region in Kenya, but this will be resolved during 2016. The information on diversity will be compared to that on land use development and traffic load (number of vehicles passing) in the specific regions.



The map shows the transects already monitored and the proposed transects for the regions of Loliondo and Mara. These may be adjusted before being monitored later in 2016 (photo contributed by Bente Jessen Graae).



Project teams carrying out road transect surveys. They drive through long road sections and record all the large animals they can see from the car and determine their distance from the road (photo contributed by Bente Jessen Graae).

The group studying vegetation responses to land use and climate has also been very busy. Postdoctoral scientist Stuart Smith and his collaborators John Bukombe, Shombe Hassan, Pius Kavana, Richard Lyamuya and others have been in the field most of March, May and June to set up study sites inside and outside the park.

They started with four sites at Mwatimba and Makao, south of Maswa, and corresponding sites inside the Maswa Game Reserve; these are along a precipitation gradient. Further north, they will have sites close to Ikoma (high precipitation) and Loliondo (lower precipitation) with corresponding sites inside the Serengeti National Park. At all sites they will have exclosed plots for comparison with non-exclosed plots to monitor the impacts of grazing on above-ground and below-ground plant productivity. The study design additionally aims to examine the importance of trees for grassy vegetation productivity and nutrient cycling.

Contributed by Bente Jessen Grae, Bård Gunnar Stokke, Roel May and Craig Jackson

Training workshop and site visits take place ahead of the household questionnaire survey

On 4–9 April 2016, a training workshop was held at TAWIRI Arusha for enumerators of the household questionnaire survey by WP5. The training involved presentations by Xi Jiao, postdoctoral scientist at the University of Copenhagen, who is responsible for carrying out simulated interviews, open discussions and adjustments of the draft survey tools, and pilot testing of the questionnaires in villages adjacent to Arusha National Park.

The training focused on the household economic accounting principles of the Poverty Environment Survey approach and how the related questions could be adapted to the specific circumstances in the Greater Serengeti–Mara ecosystem. The workshop was a great start to the close collaboration between TAWIRI and the University of Copenhagen over the coming years in implementing the tasks in WP5.

Based on the feedback and practical experience of the many seasoned enumerators, a number of improvements were made to the questionnaires. The enumerators, in turn, were introduced to and obtained experience in working with the Poverty Environment Survey approach.

The next round of training will be conducted in July immediately before commencing the first round of the four scheduled quarterly surveys and will hopefully include the enumerators from Kenya.

After the training workshop, team members from TAWIRI and the University of Copenhagen took a two-week field trip circling the Tanzanian part of the Serengeti–Mara ecosystem with the aim of selecting sites for the household questionnaire survey.

The team visited relevant district offices and selected villages to collect basic contextual information and validate the pre-selection of villages based on geographic information systems and secondary sources. In total, 21 villages have been selected in Tanzania. Another four villages will be selected in Kenya following a similar approach.

Contributed by Martin Nielsen

Solomon Zena Waleign to join the WP5 team as a postdoctoral scientist

On 16 March 2016, WP5 completed job interviews for the second of the two postdoctoral scientist positions included in this work package. The Department of Food and Resource Economics at the University of Copenhagen received applications from 12 people; four met the qualifications and, subsequently, three were interviewed. We are happy to announce that we are in the process of signing a contract with the successful candidate, Solomon Zena Waleign.

Solomon studied for his PhD at the Department of Food and Resource Economics, University of Copenhagen; his research thesis was on rural livelihood strategies in Nepal. We know Solomon as an excellent econometrician and an extremely productive researcher.

Solomon will be responsible for assessing the households' choice of livelihood strategies. This task aims to assess household preferences and trade-offs in choices regarding changing ecosystem services, policies and management strategies, and determine what incentives best encourage households to choose livelihood strategies that are compatible with maintaining ecosystem function and ecosystem service delivery. This will involve the use of choice experiments and potentially other behavioural field economic approaches that are still novel in a developing-country context but highly promising in terms of providing answers to urgent management questions.

Solomon will also be responsible for designing the surveys, coordinating the data collection, analyzing the data and writing the relevant output. He will start officially on 1 September 2016 and we in WP5 look forward to welcoming him into our team and working with him over the next two years.

Contributed by Martin Nielsen

Various communication activities keep project stakeholders up to date

The AfricanBioServices project has initiated a number of activities to enable it communicate to its stakeholders, including the scientific community who would benefit most from new methods and data on ecosystem services and trade-offs in the Serengeti-Mara ecosystem.

The project website is up and running and schedules for periodic virtual meetings have been developed to support internal communication among the project teams. The consortium has also inaugurated a management policy platform to identify practical strategies to bring the project's research outputs to bear on policymaking for better ecosystem management. The biannual AfricanBioServices Updates newsletter is yet another of the channels being used to share information with project stakeholders.

Face-to-face interactions during meetings are yet another important form of communication. During the 10th TAWIRI scientific conference held on 1–4 December 2015, the project organized a side meeting which was open to non-project scientists as well. The meeting provided a good opportunity for the WP leaders to present their proposed research methods as well as outputs of activities they had implemented that were relevant to the proposals made. The meeting was crowned with a general discussion session for participants to provide feedback and seek further clarification.



Participants at the side meeting during the 10th TAWIRI scientific conference held at Naura Spring Hotel, Arusha in December 2015 (photo credit: ILRI/Bernard Bett).

The research teams have also held preliminary meetings with the local communities at Narok in the Mara and Mugumu in Serengeti. These meetings provided valuable insights on options for

research and communication methods. For example, they demonstrated that participatory methods for quantifying ecosystem services would enable the project value these services from the perspective of the consumers rather than the scientists. A number of teams are therefore developing community-based research methods to achieve this target.

Through the meetings, we have also been able to identify schools as an additional channel for communicating our research findings. When the team visited Narok, pupils from the local primary school had a campaign to support a clean-up exercise within the community. This may be a useful way to communicate with the local community so the project plans to partner with such schools as part of communication activities and awareness creation at the community level.



Pupils from Aitong Primary School in the Mara Narok area lead a march to support a clean-up exercise in the community (photo credit: ILRI/Bernard Bett).

During these meetings, we distributed copies of Kiswahili versions of the project brochure. The brochure uses pictograms to show the linkages between the key drivers of change that the project is analysing, namely, climate and changes in land use, demographics and ecosystems. The brochure will be translated into the Maasai language to enhance its uptake by the local community.

We are grateful to all project partners for the roles they have played in communication and dissemination, especially the TAWIRI team for helping to develop the brochure and facilitating the community meetings in Serengeti.

Contributed by Bernard Bett

Recent publication

Dublin, H.T. and Ogutu, J.O. 2015. Population regulation of African buffalo in the Mara–Serengeti ecosystem. *Wildlife Research* 42(5): 382–393. <http://dx.doi.org/10.1071/WR14205>

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